

How do we ensure food for the future?

Trends and opportunities in policy, demography and productivity

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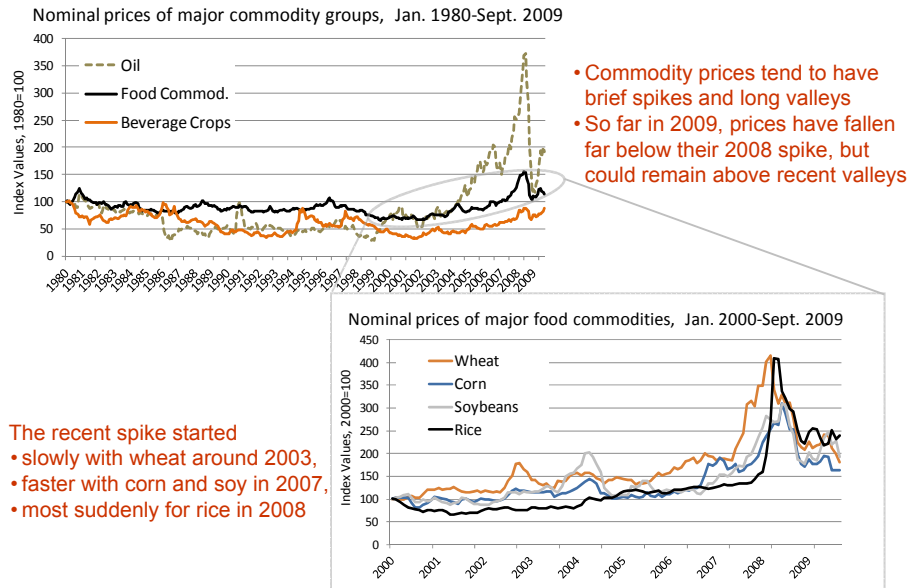
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How do we ensure food for the future?

- Overview
 - Prices, income and the extent of under-nutrition
- Trends and opportunities in world markets
 - Policy: government influence on food prices
 - Demography: population growth and change
 - Productivity: the green revolution and GMOs
- Conclusions

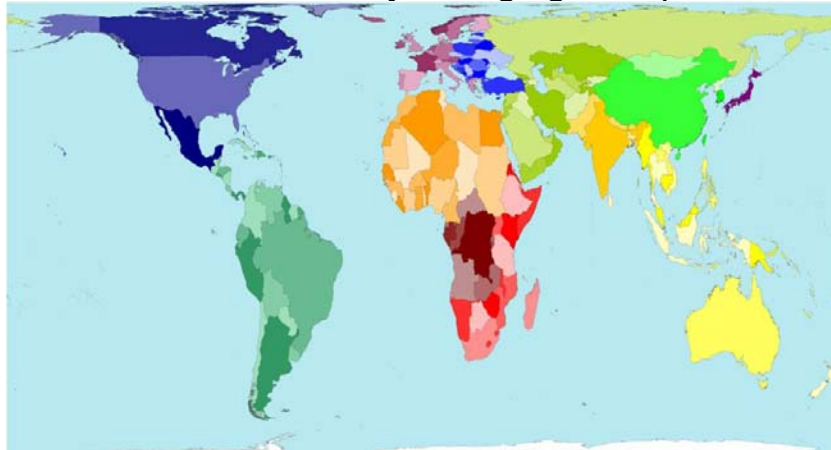
Overview of world food markets: Prices track change in worldwide demand & supply



Source: Computed from IMF data, at www.imf.org/external/data.htm, downloaded 15 Oct. 2009

Purchasing power to buy food is not evenly distributed around the world...

Who is most affected by changing food prices?

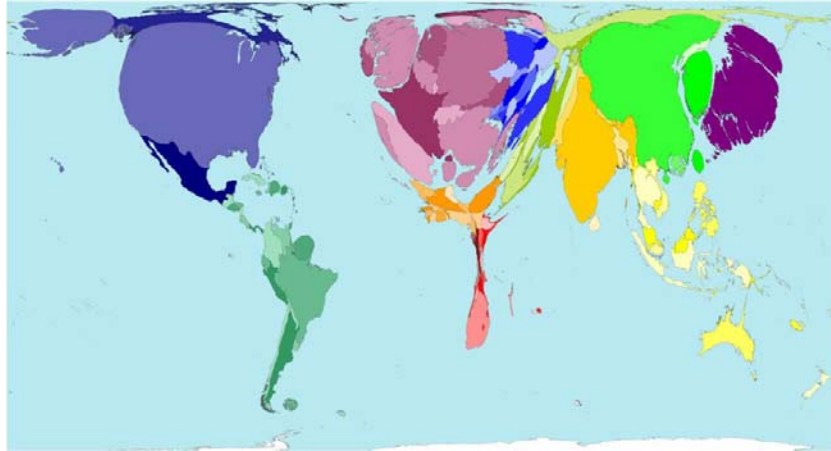


Source: www.worldmapper.org/display.php?selected=1

Note: Country sizes proportional to land area.

Purchasing power determines access to food

Here is a wallet's-eye view of the world:

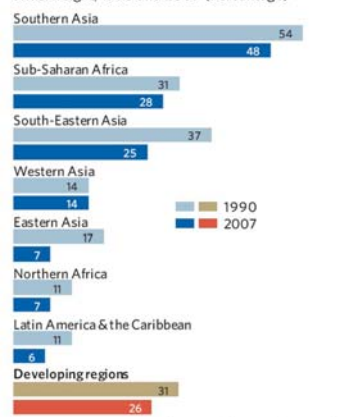


Source: www.worldmapper.org/display.php?selected=170

Note: Areas weighted by 2002 income in purchasing power parity terms.

Despite low income, undernutrition was falling ...until the 2007-09 food & financial crises

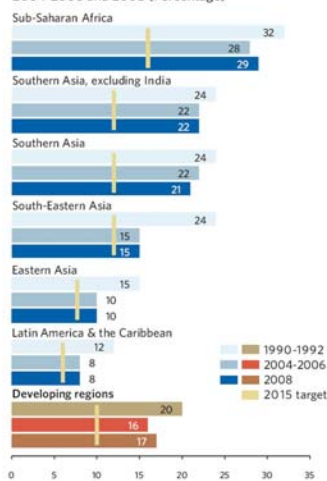
Proportion of children under age five who are underweight, 1990 and 2007 (Percentage)



Note: Prevalence of underweight children is estimated based on the NCHS/WHO/CDC reference population.

(Based on surveys of child bodyweights)

Proportion of undernourished population, 1990-1992, 2004-2006 and 2008 (Percentage)



(Based on estimated food availability)

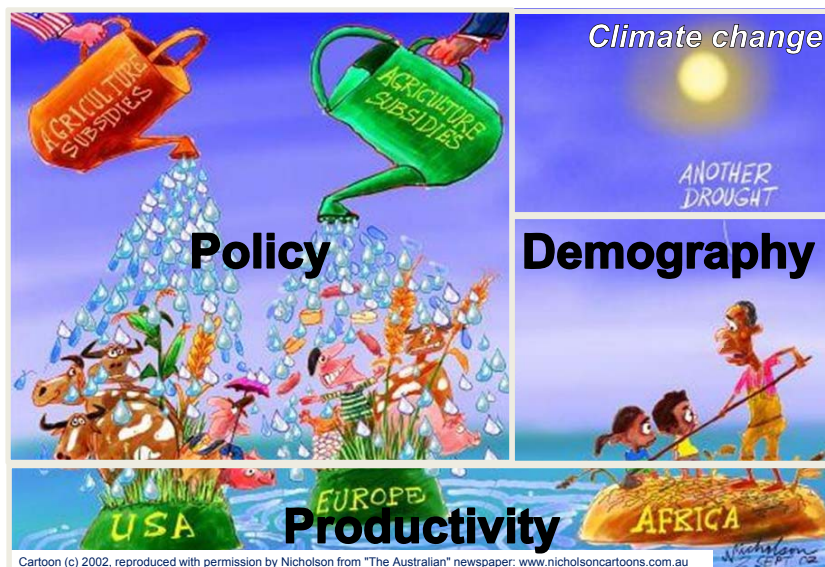
Source: UN Millennium Development Goals Report, July 2009. Online at <http://mdgs.un.org>.

What's behind world food markets?



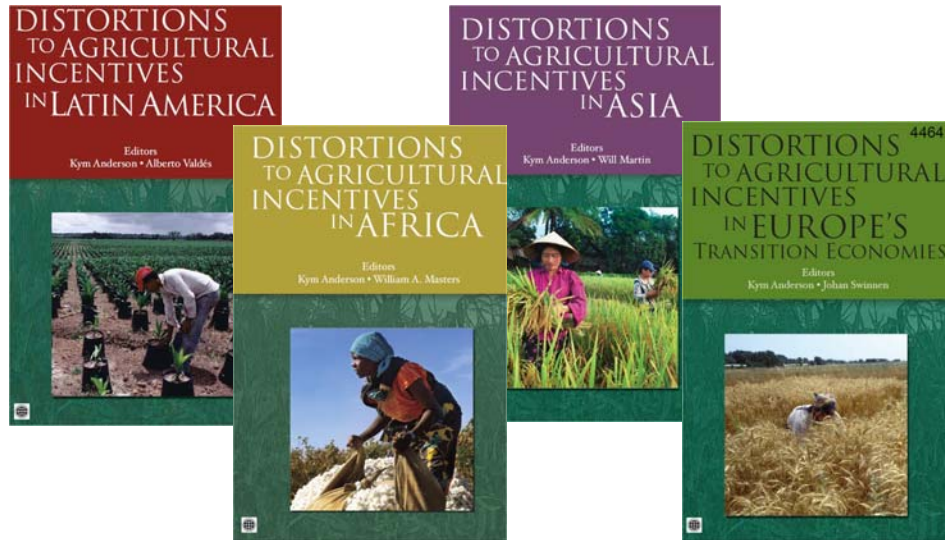
We will drill into three parts of the picture:

Policy • Demography • Productivity



Policy • Demography • Productivity

We have a lot of new evidence on how governments influence food prices



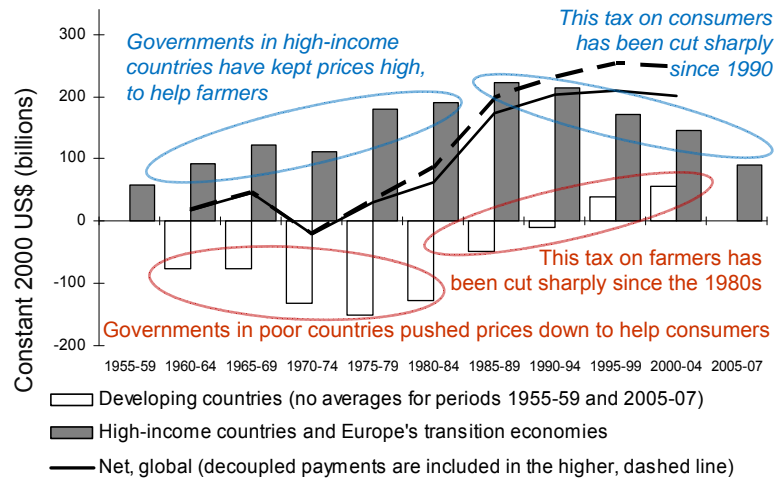
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The World Bank *Distortions* Project

- Four regional volumes published in 2008
- Two global volumes forthcoming in 2009
 - Worldwide summaries including industrialized countries
 - Political economy explanations for policy choices
- All from a three-year project, involving 100+ researchers and case studies for 68 countries, 77 commodities over 40+ years
- A massive dataset of over 25,000 government interventions for a particular product, country and year
- All available online at www.worldbank.org/agdistortions

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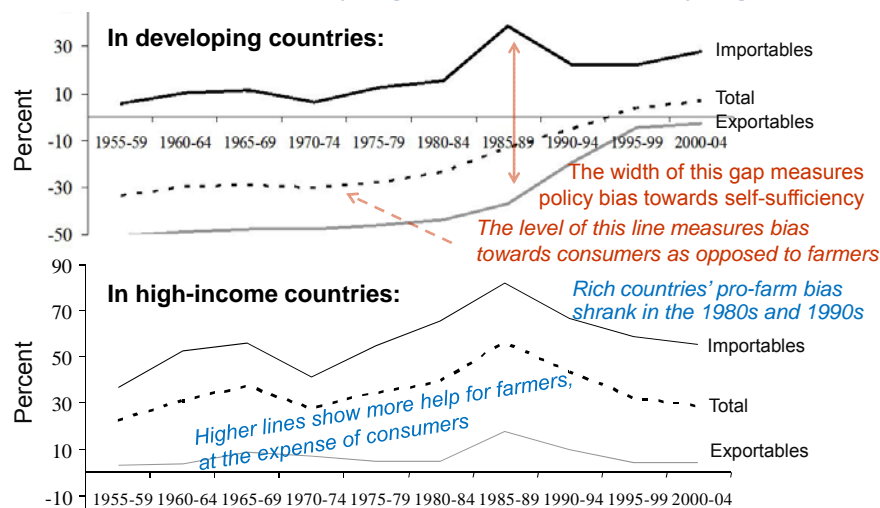
The big picture:
Food policies vary widely and have changed a lot



Source: Anderson, K. (forthcoming), *Distortions to Agricultural Incentives: A Global Perspective, 1955 to 2007*, London: Palgrave Macmillan and Washington DC: World Bank.

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Government policies tend to favor self-sufficiency
and to switch from helping consumers to helping farmers



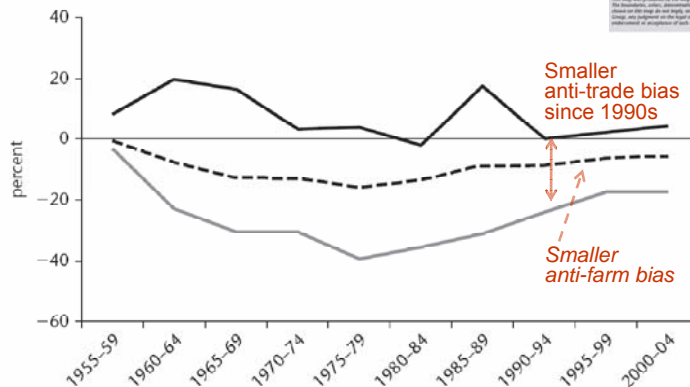
Source: Anderson, K. (forthcoming), *Distortions to Agricultural Incentives: A Global Perspective, 1955 to 2007*, London: Palgrave Macmillan and Washington DC: World Bank.

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Africa has had very large and sustained reforms since the 1990s

Figure 1.3. NRAs for Exportable, Import-Competing, and All Farm Products, 16 African Countries, 1955–2004

a. Unweighted averages across 16 countries



Source: K. Anderson and W. Masters (eds), *Distortions to Agricultural Incentives in Africa*. Washington, DC: The World Bank, 2009.

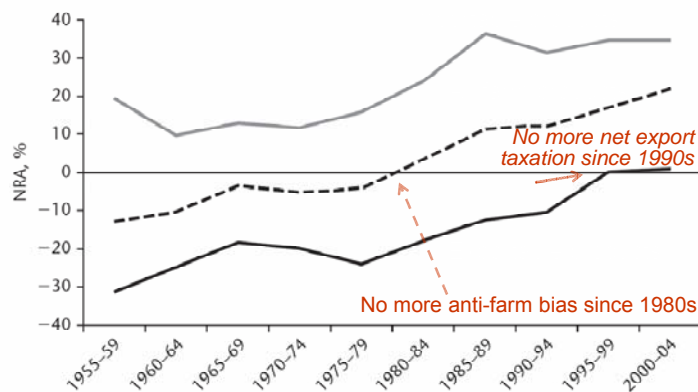


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Asia has large pro-farm shift; ending net export taxes in 1990s, net support to ag. since 1980s

Figure 1.5. NRAs for Exportable, Import-Competing, and All Agricultural Products, Asian Focus Economies, 1955–2004

a. Unweighted averages



Source: K. Anderson and W. Martin (eds), *Distortions to Agricultural Incentives in Asia*. Washington, DC: The World Bank, 2009.

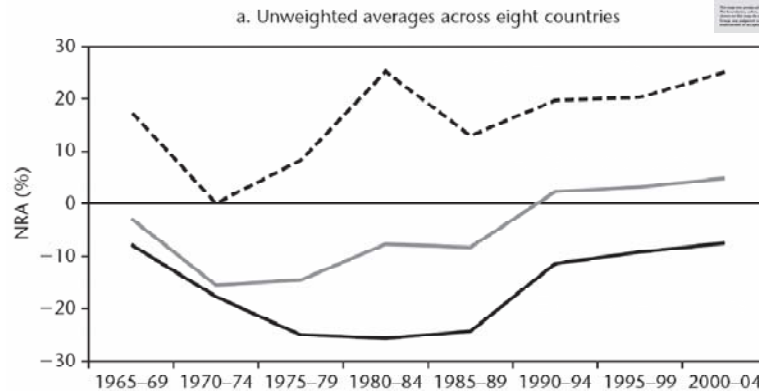


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Latin America has had similar trends at a slower pace, supporting ag. since 1990s



Figure 1.3. NRAs for Exportable, Import-Competing, and All Agricultural Products, Latin America, 1965–2004



Source: K. Anderson and A. Valdes (eds), *Distortions to Agricultural Incentives in Latin America*. Washington, DC: The World Bank, 2009.

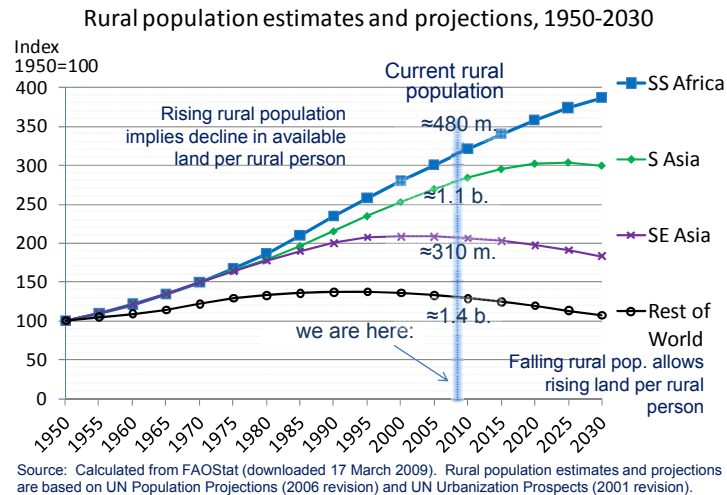
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The policy scorecard:
Big improvements, more to be done

- In 1995-2005, the world's poorest gained from large reforms
 - in Africa, reductions in both anti-farm and anti-trade bias
 - in Asia, less increase in pro-farm bias than income growth suggested
- Substantial policy problems remain
 - e.g. for Africa, total net tax per ag. worker \approx \$41 in 2000-04, much larger than public investment or foreign aid to the sector
 - dispersion and instability remain large; more uniform and stable tariffs could reduce welfare costs for a given fiscal balance
- Gains may be fragile:
 - the 2007-08 food crisis broke trust in world markets
 - the 2008-09 financial crisis cut other sources of revenue
 - both crises could lead to higher trade restrictions

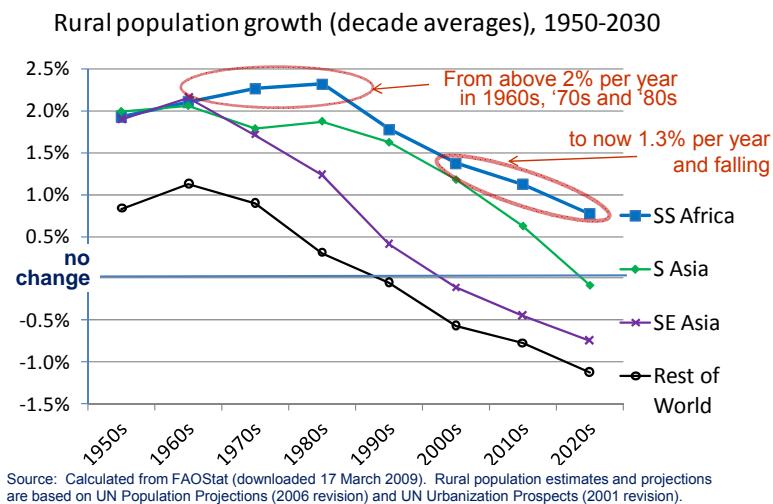
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A neglected driver of change: Rural population pressure



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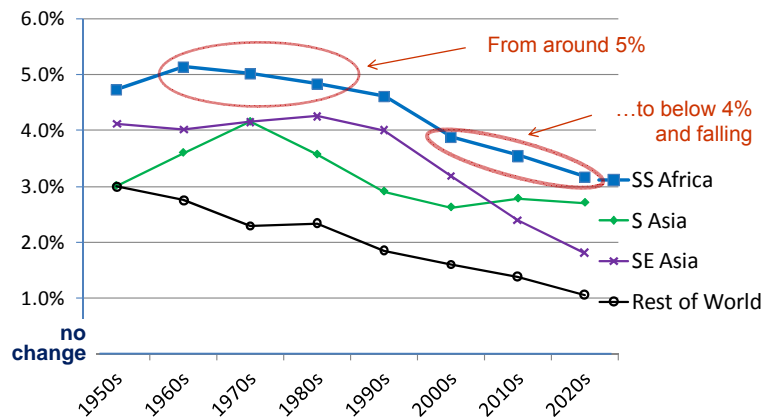
Looking forward: A window of opportunity in demographic change



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Looking forward:
A window of opportunity also in urban areas

Urban population growth (decade averages), 1950-2030

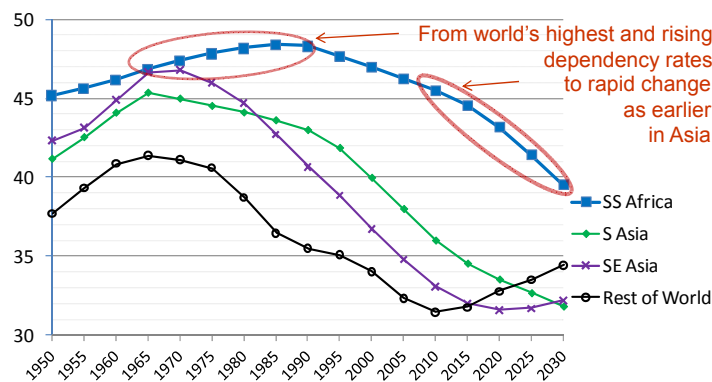


Source: Calculated from FAOSTat (downloaded 17 March 2009). Rural population estimates and projections are based on UN Population Projections (2006 revision) and UN Urbanization Prospects (2001 revision).

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Looking forward:
A window of opportunity from less dependency

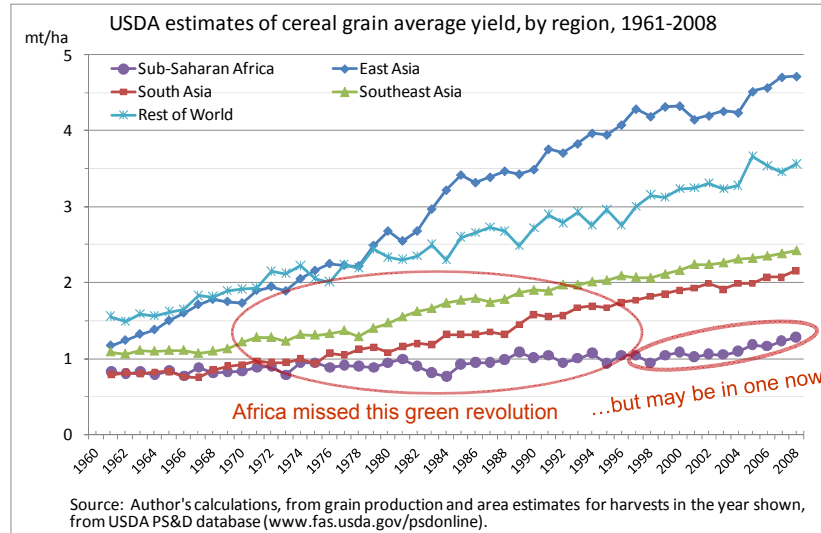
Total dependency rates (ages 0-14 and 65+), 1950-2030



Source: Calculated from UN Population Projections, 2008 revision (March 2009), at <http://esa.un.org/unpp>.

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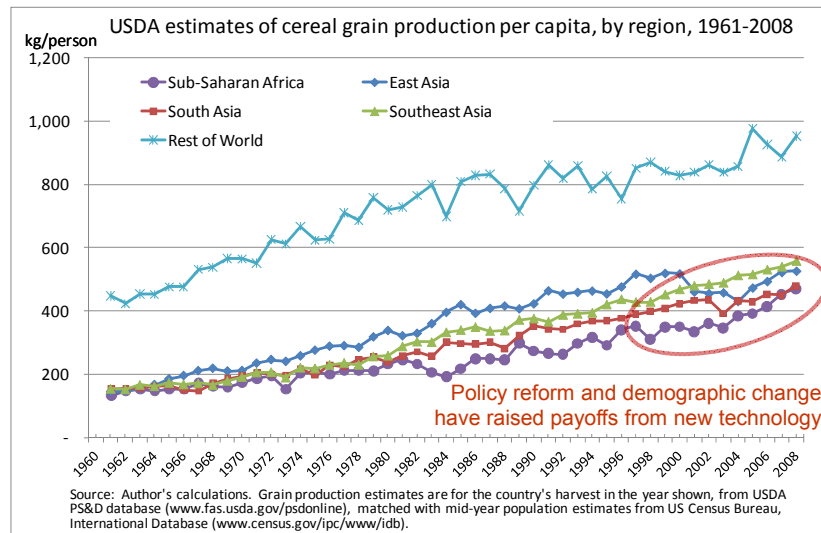
Africa is far behind, but turning up



Reproduced from W.A. Masters (2008), "Beyond the Food Crisis: Trade, Aid and Innovation in African Agriculture," [African Technology Development Forum](#) 5(1): 3-15.

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Grain output per capita now equals South Asia's

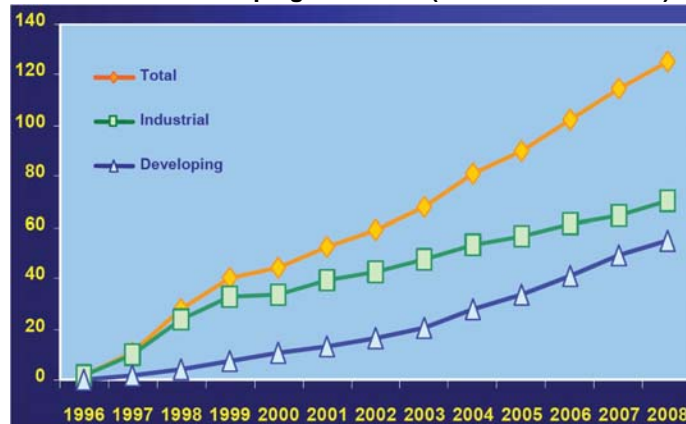


Reproduced from W.A. Masters (2008), "Beyond the Food Crisis: Trade, Aid and Innovation in African Agriculture," [African Technology Development Forum](#) 5(1): 3-15.

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New biotechnologies hold great promise

Global Area of Biotech Crops, 1996 to 2008:
Industrial and Developing Countries (millions of hectares)



Approx. share
of global farm
area in 2008

Worldwide:
2.5% of
4.96 b. ha

Indust. Co.:
5.4% of
1.29 b. ha

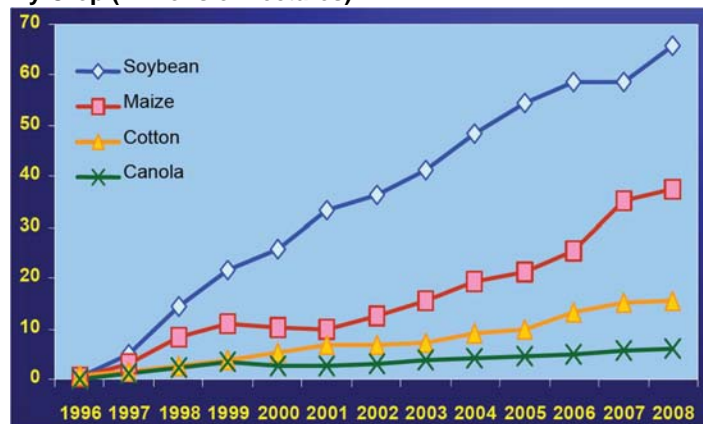
Dev'ing. Co.:
1.5% of
3.67 b. ha

Reproduced from Clive James (2008), *Global Status of Commercialized Biotech/GM Crops: 2008*.
ISAAA Brief No. 39. ISAAA: Ithaca, NY (www.isaaa.org).

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New biotechnologies hold great promise
but so far only for a few crops

Global Area of Biotech Crops, 1996 to 2008,
By Crop (millions of hectares)



Share of global
area for that
crop in 2008

Soybeans:
70% of
95 m. ha

Maize:
24% of
157 m. ha

Cotton:
46% of
34 m. ha

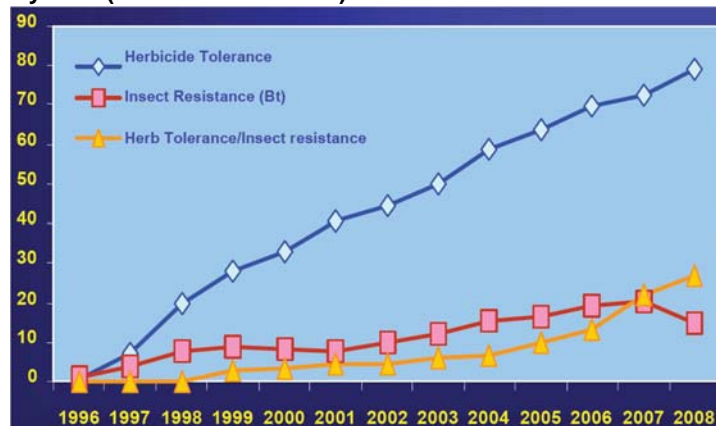
Canola:
20% of
30 m. ha

Reproduced from Clive James (2008), *Global Status of Commercialized Biotech/GM Crops: 2008*.
ISAAA Brief No. 39. ISAAA: Ithaca, NY (www.isaaa.org).

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New biotechnologies hold great promise
but so far only through a few traits

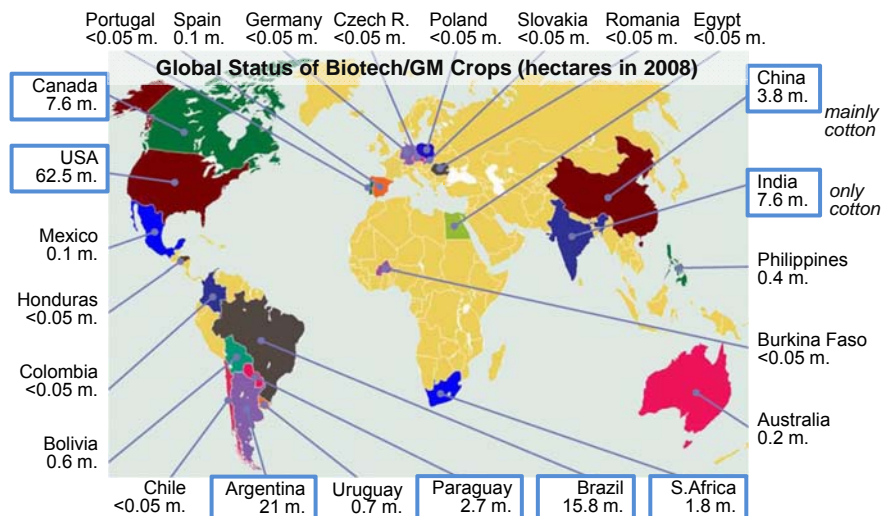
**Global Area of Biotech Crops, 1996 to 2008,
By Trait (millions of hectares)**



Reproduced from Clive James (2008), *Global Status of Commercialized Biotech/GM Crops: 2008*. ISAAA Brief No. 39. ISAAA: Ithaca, NY (www.isaaa.org).

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New biotechnologies hold great promise
but so far a relatively narrow impact

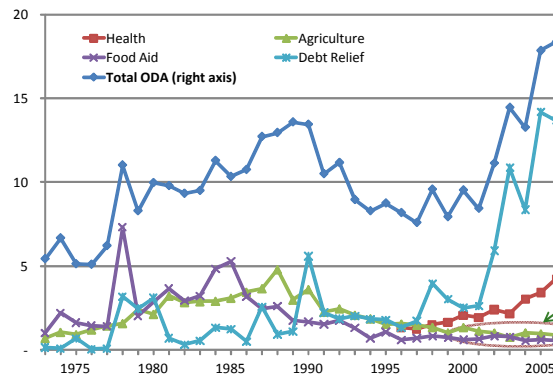


Reproduced from Clive James (2008), *Global Status of Commercialized Biotech/GM Crops: 2008*. ISAAA Brief No. 39. ISAAA: Ithaca, NY (www.isaaa.org).

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We have contributed little to Africa's farm productivity gains in recent years

ODA commitments to Africa in selected sectors and total, 1973 -2006
(real US dollars per capita)



Source: Author's calculations, from OECD Development Assistance Committee (2008), *Bilateral ODA commitments by Purpose* (www.oecd.org/dac), deflated by OECD deflator (2005=100) and divided by midyear population estimates for Sub-Saharan Africa from the U.S. Census Bureau, International Database.

Reproduced from W.A. Masters (2008), "Beyond the Food Crisis: Trade, Aid and Innovation in African Agriculture." *African Technology Development Forum* 5(1): 3-15.

Foreign aid to African agriculture has fallen to about US\$1 per capita (vs. \$4/pers. in health and \$38 in total ODA). This is so low that big proportional increases are affordable

Conclusions

How do we ensure food for the future?
Trends and opportunities

- Farm policy: past reforms
 - Poor countries have cut taxes on their farmers, and not (yet) raised them (much) on their consumers
 - Substantial distortions remain, could be reduced at low fiscal cost
- Rural demography: softer headwinds
 - Population growth is slowing
 - Africa was only major region above 2%, will soon be below 1%
 - Africa's urban growth also slowing, from above 5% to below 4%
 - Dependency rates are falling
 - Africa's age structure is entering an Asia-style "demographic gift"
- Crop productivity: visible improvements in Africa
 - Africa's cereal yields per hectare turned up in 2000s
 - Africa's cereal output per capita now equals South Asia's
 - The U.S. and other donors could do much more to help!